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- 3 MAY 2003

06MAY03 E804983-1 D00115
P01/7700 0-00-0310296.9

Request for grant of a patent

(see notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form)

The Patent Office

Cardiff Road
Newport
Gwent NP10 8QQ

1. Your reference

A2701

2. Patent application number

(the Patent Office will fill in this part)

0310296.9

- 3 MAY 2003

3. Full name, address and postcode of the or of each applicant (underline all surnames)

Automotive Products Italia (SV) S.p.A.
Corso Marconi 160
17014 Cairo Montenotte
Savona
ITALY

8139974001

Patents ADP number (*if you know it*)

If the applicant is a corporate body, give the country/state of its incorporation

Italy

4. Title of the invention

HANDBRAKE ADJUSTER WITH CLAMPED WEDGE

5. Name of your agent (*if you have one*)

R Morrall

"Address for service" in the United Kingdom to which all correspondence should be sent

(including the postcode)

Automotive Products Group Ltd
Patent Department
PO Box 2085
Tachbrook Road
Leamington Spa
Warwickshire
CV31 3ZL

781 930 3001

Patents ADP number (*if you know it*)

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications (*if you know it*) the or each application number

Country	Priority application number (<i>if you know it</i>)	Date of filing (<i>day/month/year</i>)
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7. If this application is divided or otherwise derived from an earlier UK application

Number of earlier application	Date of filing (<i>day/month/year</i>)
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8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (*Answer 'Yes' if:*

a) any applicant named in part 3 is not an inventor, or

b) there is an inventor who is not named as an applicant, or

c) any named applicant is a corporate body:

See note (d)

YES

Patents Form 1/77

9. Enter the number of sheets for any of the following items you are filing with this form.
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Continuation sheets of this form

Description 5

Claim(s)

Abstract

Drawings 3 + 3

10. If you are also filing any of the following, state how many against each item.

Priority documents

Translations of priority documents

Statement of inventorship and right to grant of a patent (*Patents Form 7/77*)
Request for preliminary examination and search (*Patents Form 9/77*)

Request for substantive examination (*Patents Form 10/77*)

Any other documents
(please specify)

11. I/We request the grant of a patent on the basis of this application
Signature *R. Morrall* Date 2/5/03
R Morrall - Agent

12. Name and daytime telephone number of person to contact in the United Kingdom
R Morrall 01926 473703

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Notes

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b) Write your answers in capital letters using black ink or you may type them.
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PARKING BRAKES

This invention relates to parking brakes and in particular to parking brakes hereinafter referred to as of the type described which comprise a drum containing a pair of brake shoes, a handbrake lever pivoted adjacent one end on one of the shoes, and a strut extending between a first abutment on the handbrake lever and a second abutment on the other brake shoe so that pivoting of the handbrake lever relative to said one shoe moves the strut which in turn moves the other shoe away from said one shoe to bring the shoes into contact with the drum and thus apply the parking brake.

Parking brakes of the type described are well known and work efficiently particularly when they are actuated manually by a conventional driver operated lever. There is, however, an increasing requirement to provide parking brakes which are capable of electric motor application in order to dispense with the conventional manually operated lever.

One problem associated with electric motor actuated parking brakes is that the actuation system often has a relatively limited movement capability and this can therefore provide difficulties in ensuring efficient and sufficiently long lived actuation of the parking brake function when teamed with a parking brake of the type described which includes significant inherent lost motion in its actuation linkage.

In the applicants co-pending Application No GB 0221018.5 there is described a parking brake of the type described in which one of the abutments comprises a biased wedging means which acts on the strut to take up all play in the thrust path between the handbrake lever and the other brake shoe via the strut.

Such an arrangement can significantly reduce the lost motion in the parking brake actuating arrangement due to manufacturing, assembly and adjustment clearances between the strut and the first and second abutments and can also compensate for wear (due, for example, to Brinelling) of these components resulting from the high loads imposed on these components.

However, problems can arise with such parking brakes if, when the parking brake is released, the brake shoes remain stuck to the drum due to stiction since the wedging means will operate thus adjusting the effective length of the strut into too long a condition and preventing subsequent full release of the shoes from the drum even if the stiction effect is overcome.

It is therefore necessary to provide a means for disabling the wedging means from operating except when initial manufacturing or assembly clearance are being taken up in the strut or when a subsequent adjustment of shoe clearances is being made.

The means for disabling the wedging means may comprise, for example, a releasable clamping means which prevents sliding of the wedge means relative to the co-operating abutment.

Typically the second abutment comprises a biased wedge one edge of which slides along a plate secured to the web of the other shoe, a further edge of the wedge sliding along a further abutment surface on the strut. Preferably the further abutment surface on the strut comprises the root of a forked end portion of the strut, the forked end having two prongs which extend on opposite sides of a web of the other brake shoe.

In such an arrangement the clamping means may comprise a clamping plate which is drawn down onto the biased wedge by a screw or bolt to clamp the wedge to the web of the other shoe to prevent adjustment of the clearances.

The ends of the brake shoes remote from the strut may pivot on a fixed reaction abutment or on a manual or automatic wear adjustment device positioned between the ends of the shoes. For example the automatic wear adjustment devices for a parking brake described in the Applicant's co-pending applications Nos. 02 21019.3 and 02 23797.2 are particularly suitable.

One embodiment of the present invention will now be described, by way of example only, with reference to the accompanying drawings in which:-

Figure 1 shows a perspective view of the brake shoes and actuating mechanism of a parking brake in accordance with the present invention and;

Figures 2 and 3 show on a larger scale the clamped biased wedging arrangement used in the parking brake of Figure 1 in the initial brake shoes unworn condition and in a subsequent brake shoes worn condition respectively, and

Figure 4 shows diagrammatically further details of the clamped biased wedging arrangement of Figures 2 and 3.

Referring to the drawings this shows the shoe arrangement for a parking brake for use in a so-called drum in disc brake in which a pair of shoes 11 and 12 are mounted on a backplate (not shown) The upper ends of the shoes are pulled against a fixed backplate mounted abutment (not shown) or against a separate abutment on the adjacent vehicle suspension by a return spring 15 and the other ends of the shoes pivot on a wear adjustment device shown at 16 in figure 1. This wear adjustment device may be manually adjusted (as shown) or automatically adjusted as, for example, disclosed in the automatic parking brake adjustment device disclosed in the Applicant's co-pending patent applications numbers 02 21019.3 and 02 23797.2 referred to above.

The shoes are contained within a drum (not shown) and the shoes are arranged to be brought into contact with the drum by an actuating mechanism which comprises a handbrake lever 18 which is pivoted adjacent one end by pin 19 on brake shoe 11. A strut 20 which has forked ends 20a and 20b acts between a first abutment 18a on handbrake lever 18 and a second abutment associated with brake shoe 12 in the form of a plate 22 which is riveted to the shoe 12 through rivets 24 and 25. A biased wedge 21 acts between the root 20c of forked end 20b and plate 22.

The biased wedge 21 has one edge 21a which slides down an edge 22a of plate 22 and a further edge 21b which contacts the root 20c of forked end 20b of strut 20. The wedge 21 is biased between the surface 22a and the root 20c by a wire spring 23 which encircles rivet 24

and has one end 23a engaging the wedge 21 and the other end 23b engaging a hole 26 in plate 22 or reacting against plate 22.

A means for disabling the operation of wedge 21 is provided in the form of a clamping plate 27 (which may be slightly arched as shown in Figure 4) and which bears on wedge 21 and is pulled down onto wedge 21 by a nut or screw 28 having a head 29 located on the other side of brake shoe 12 as viewed in Figures 1 to 3. This head has a screw driver or other turning formation therein which is accessible through a hole in the brake drum (not shown) so that the screw can be slackened sufficiently to allow the wedge 21 to slide relative to strut 20 and plate 22 when it is desired for any clearance between the handbrake lever 18, strut 20 and plate 22 to be taken up and which can be tightened to prevent sliding of the wedge 21 when it is desired to prevent take-up of these clearances. The hole provided in the brake drum to give access to the head 29 of clamping screw 28 can also be positioned to give access to wear adjuster nut device 16 by rotating the drum appropriately.

Thus, if when the brake is initially assembled, the screw 28 is slack to allow the wedge 21 to slide relative to plate 22 any manufacturing or assembling clearances which may be present between the abutment surface 18a on handbrake lever 18 and the co-operating root 20d of forked end 20a of strut 20 and between the root 20c and the biased wedge 21 are automatically taken up due to the biasing effect of the wire spring 23 so that there is no lost motion in the parking brake actuating mechanism. Thus all pivoting of the handbrake lever 18 relative to the brake shoe 11 by, for example, a cable 26 which is attached to the lower end 18c of handbrake lever results in immediate movement of the strut 20 and the other brake shoe 12. As explained above this is particularly advantageous if the brake is electrically actuated. Figure 2 shows the position of the wedge 21 after this initial take-up of clearances has occurred.

After this initial taking up of the clearances by the biased wedge 21 the screw is tightened to clamp wedge 21 against shoe 12 and prevent further adjustment of clearances by wedge 21. This, as explained above, avoids problems of over adjustment which would otherwise occur should the shoes become stuck to the drum due to stiction.

If it is desired to adjust the shoe clearance due to wear during servicing of the vehicle etc. using adjuster 16, for example, the wedge 21 can be reactivated during the adjustment by slackening screw 28 to allow wedge 21 to slide under the action of spring 23.

It will be apparent that when adjuster 16 is operated to move the lower ends of brake shoes 11 and 12 apart to reduce the clearance of the shoes from the associated drum this will also result in the shoes moving slightly away from the ends 20a and 20b of the strut since the shoes effectively pivot on the abutment between the upper ends of the shoes. This therefore tends to increase the clearances associated with strut 20 and thus reactivation of wedge 21 helps to restore the overall efficiency of the actuating mechanism.

Figure 3 shows the wedge 21 in a lower position relative to plate 22 after a subsequent adjustment in the clearances associated with strut 20 has taken place.

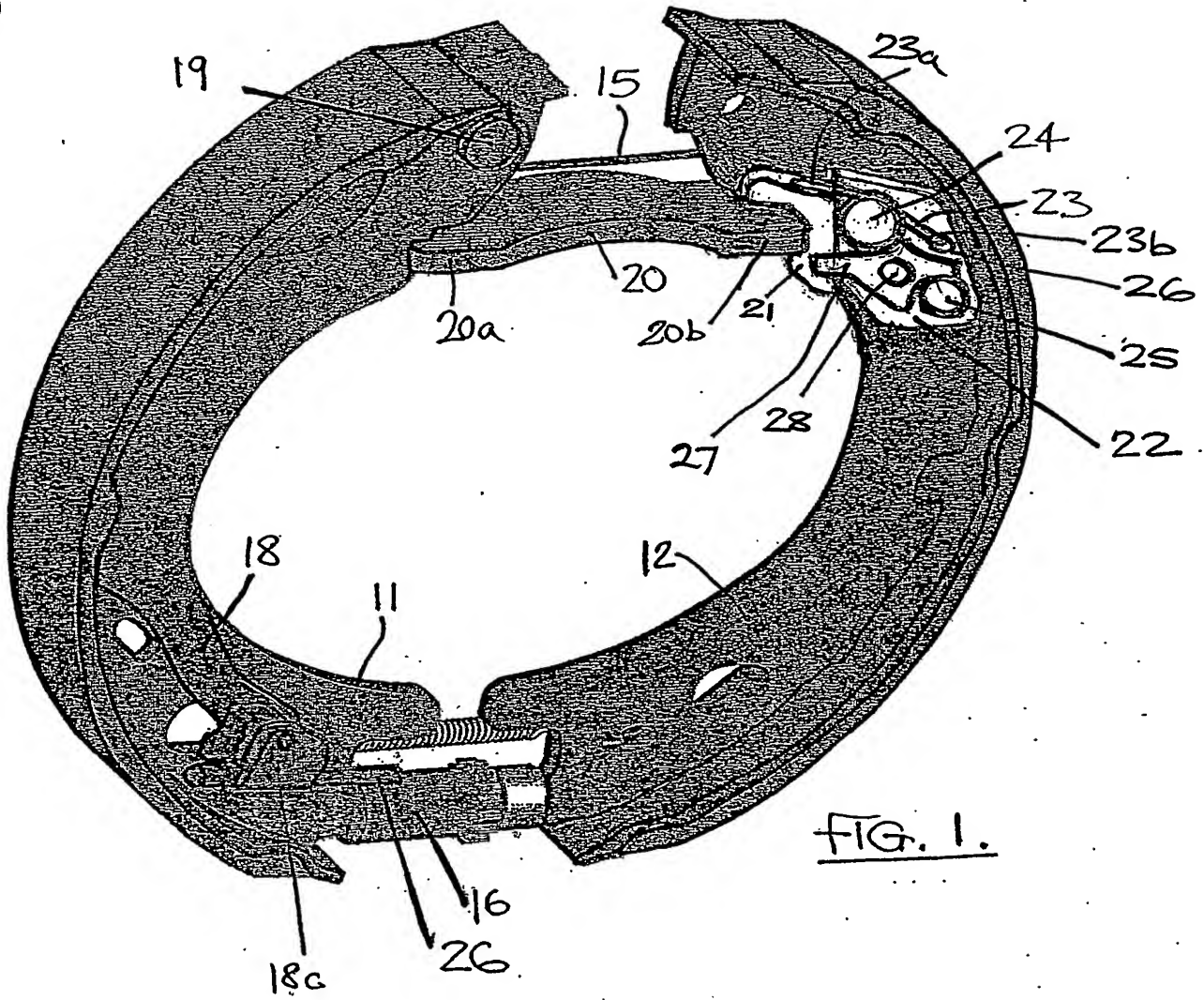


FIG. 1.

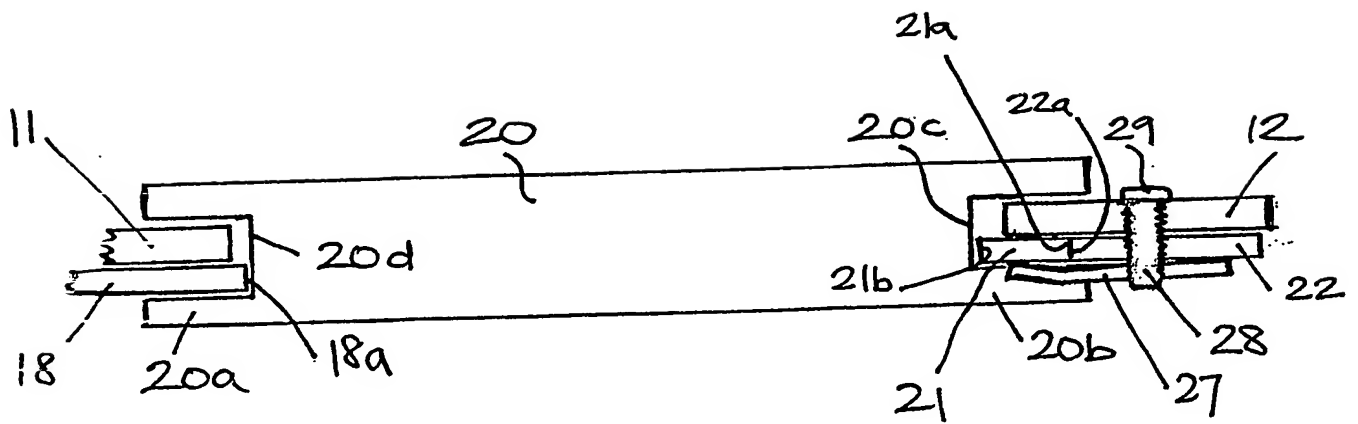


FIG. 4.

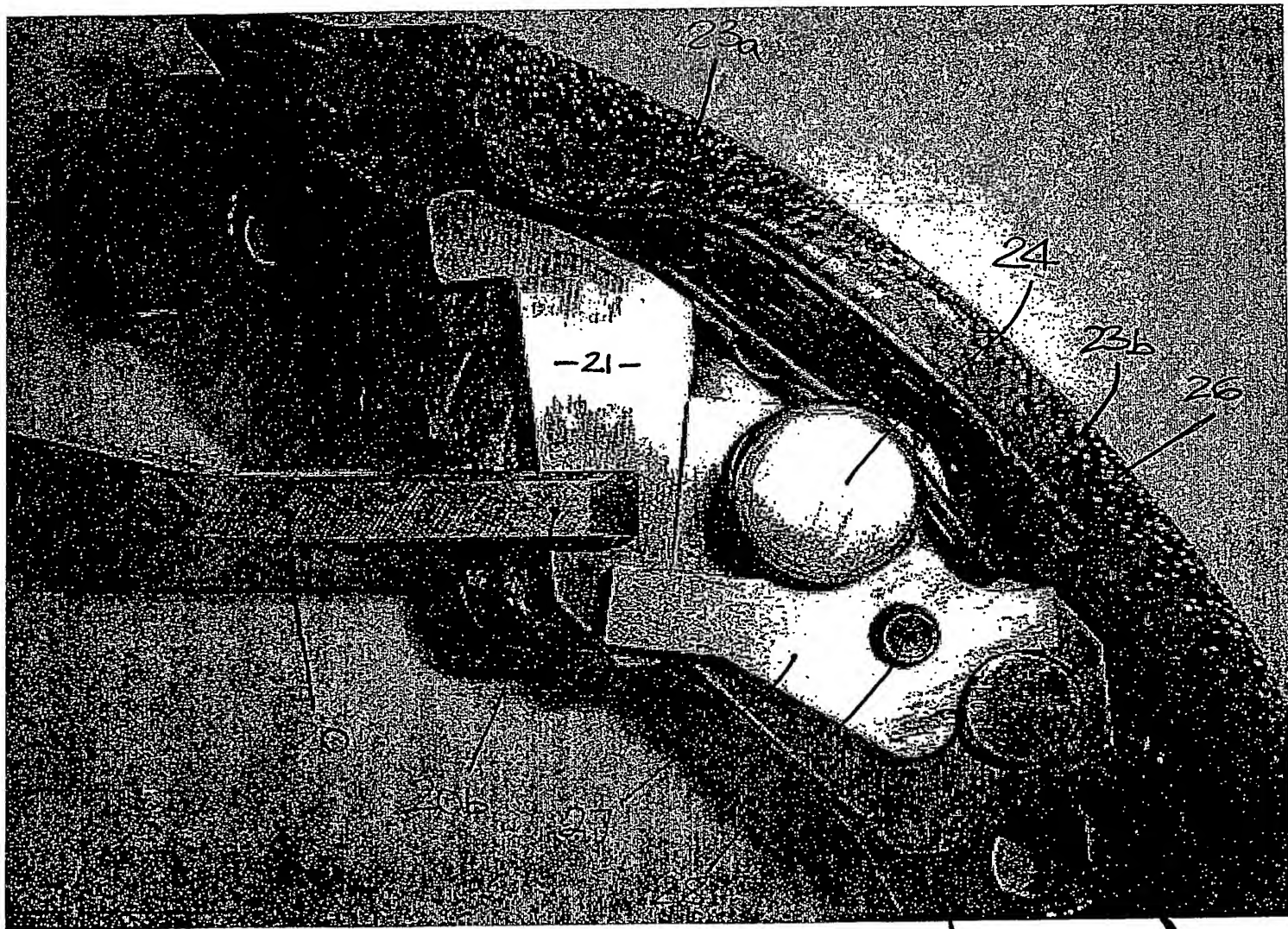


FIGURE 2

22

25

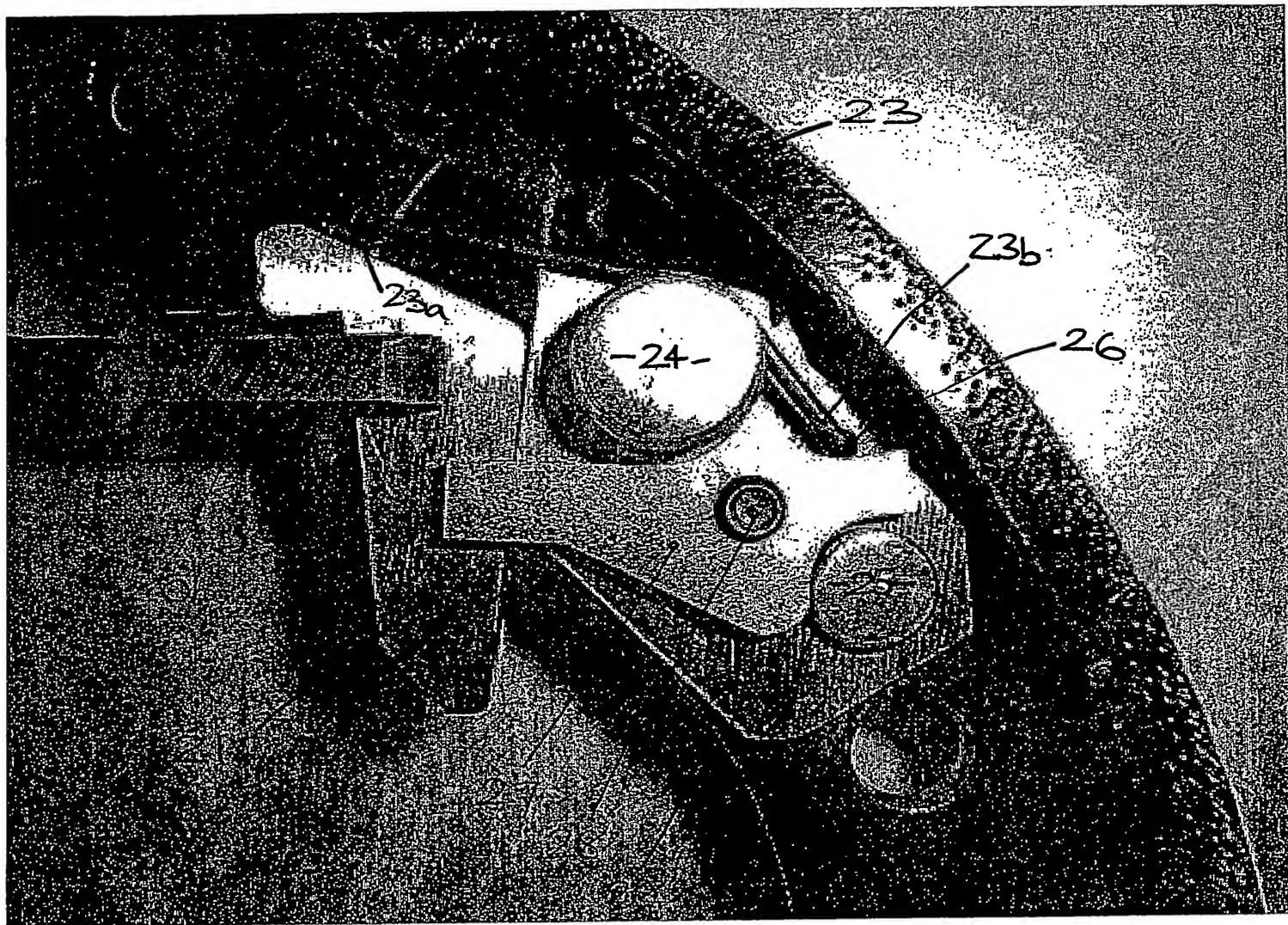


FIGURE 3

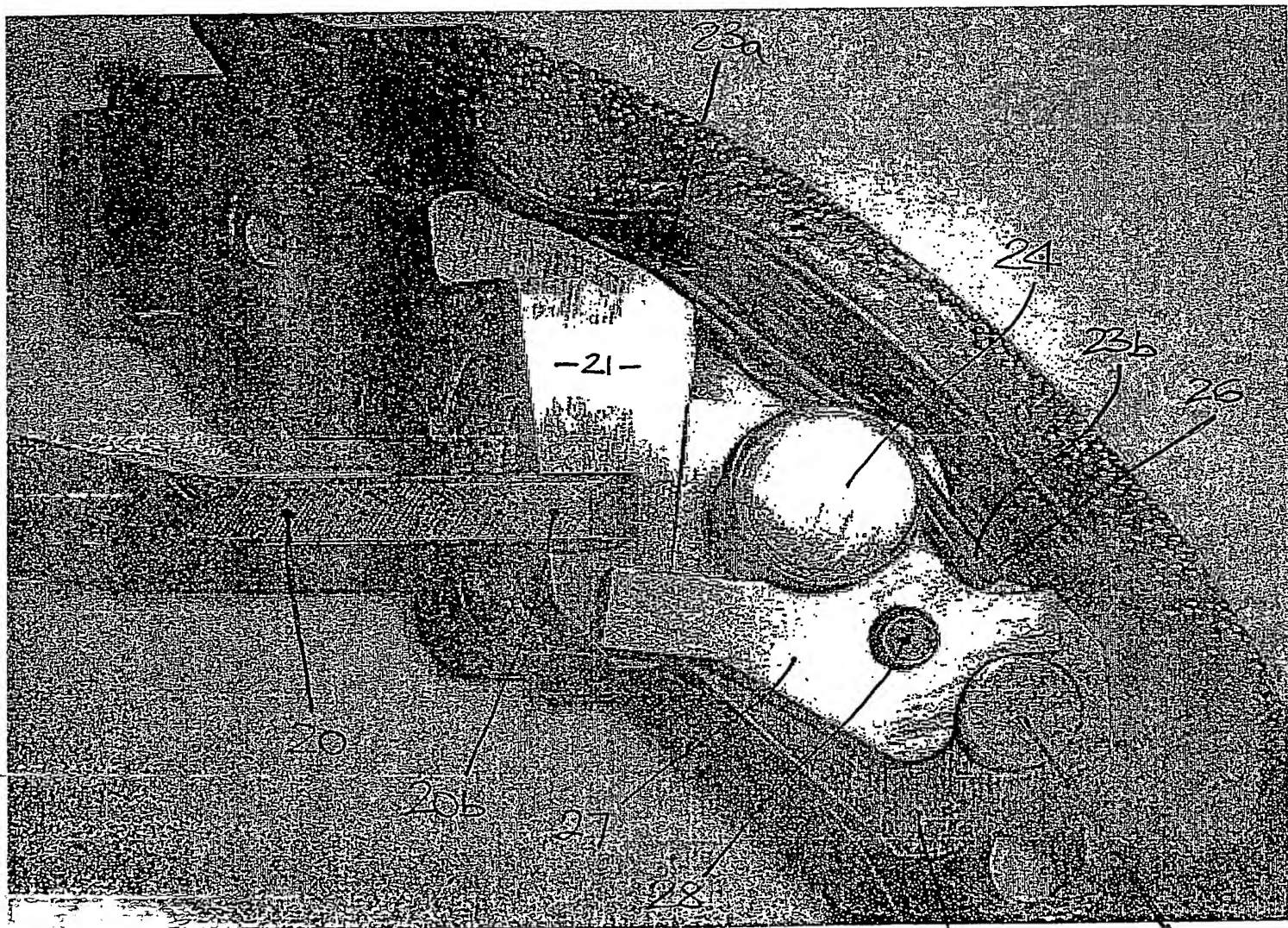


FIGURE 2

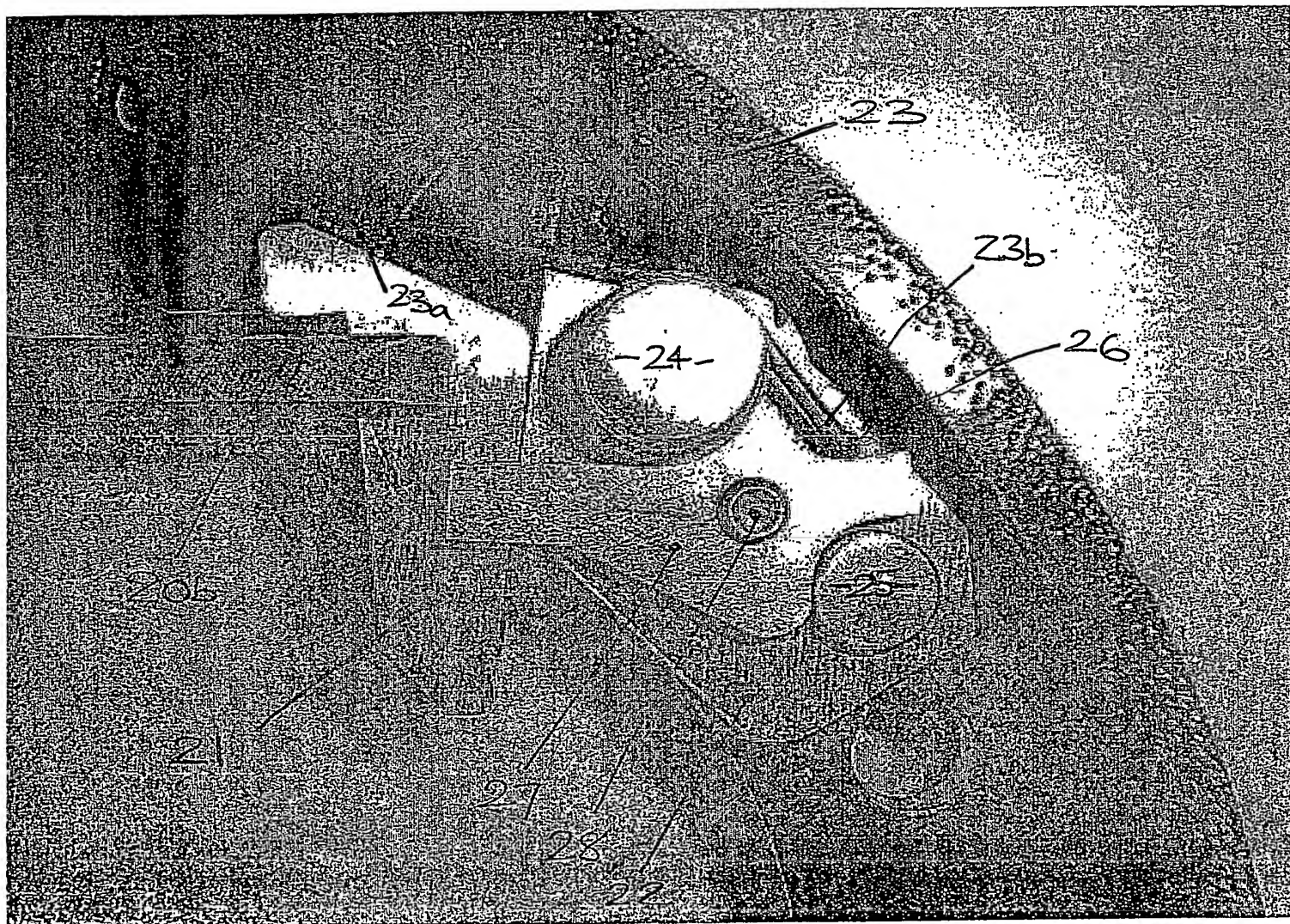


FIGURE 3

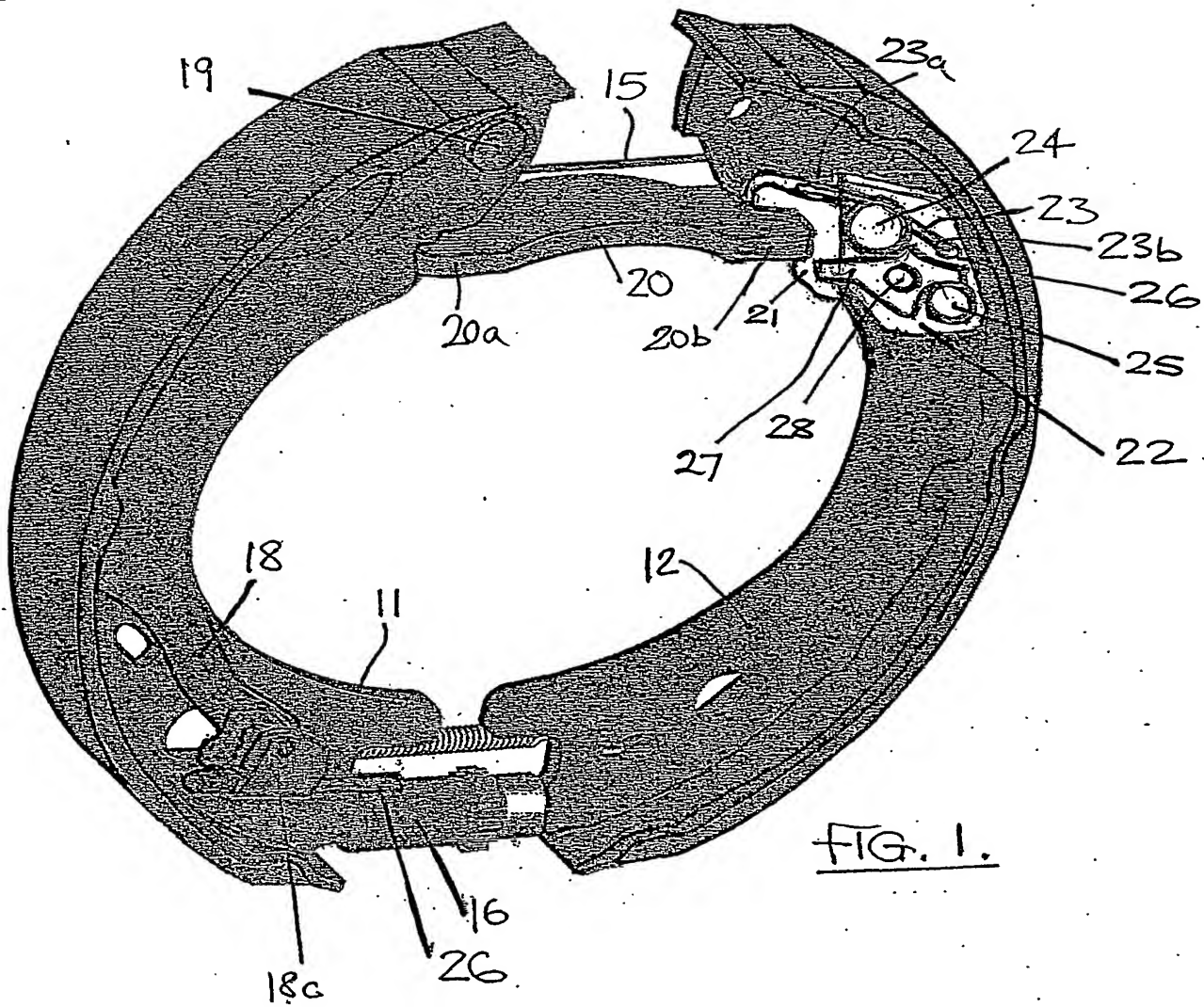


FIG. 1.

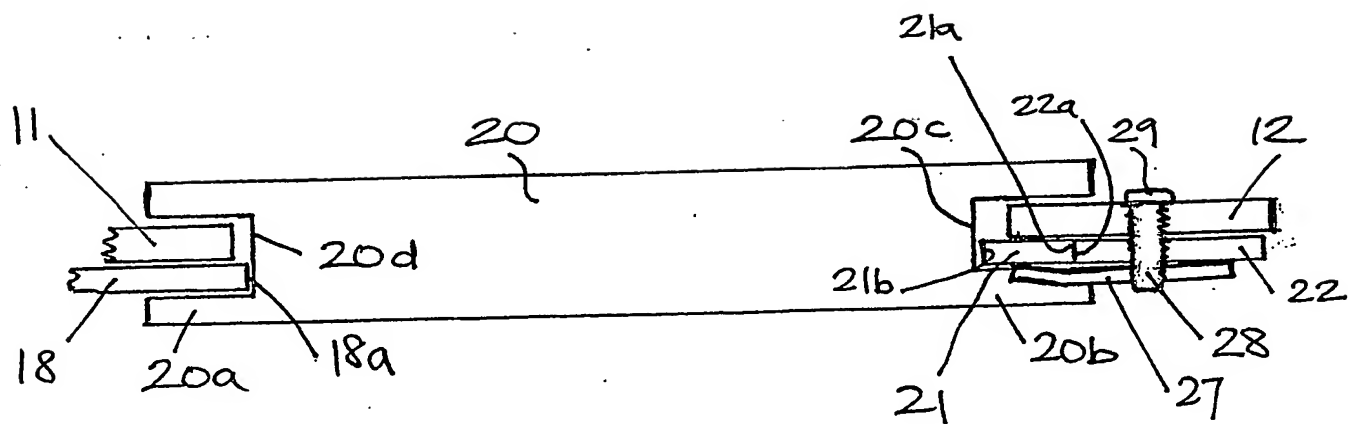


FIG. 4.

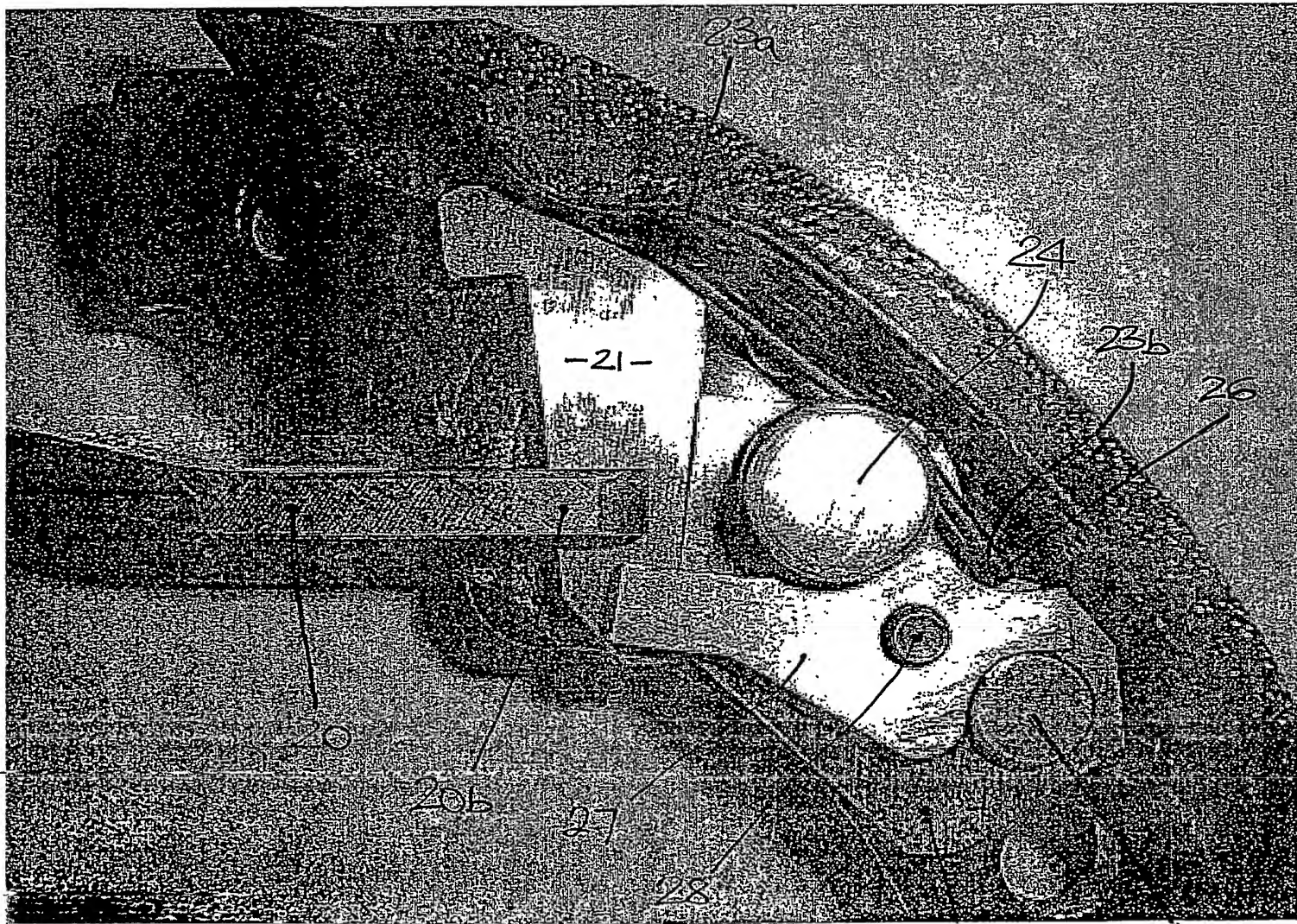


FIGURE 2

22

25

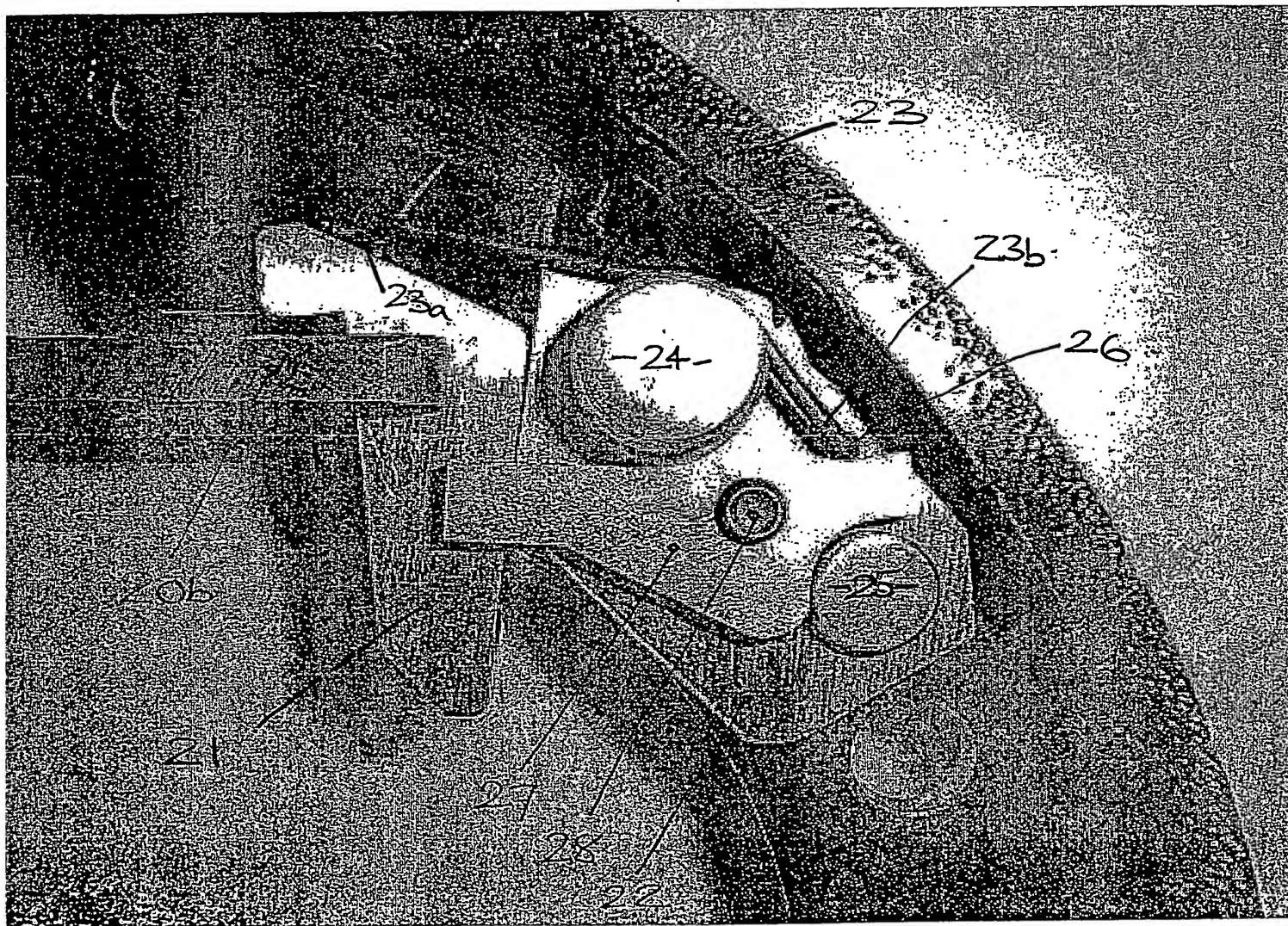


FIGURE 3

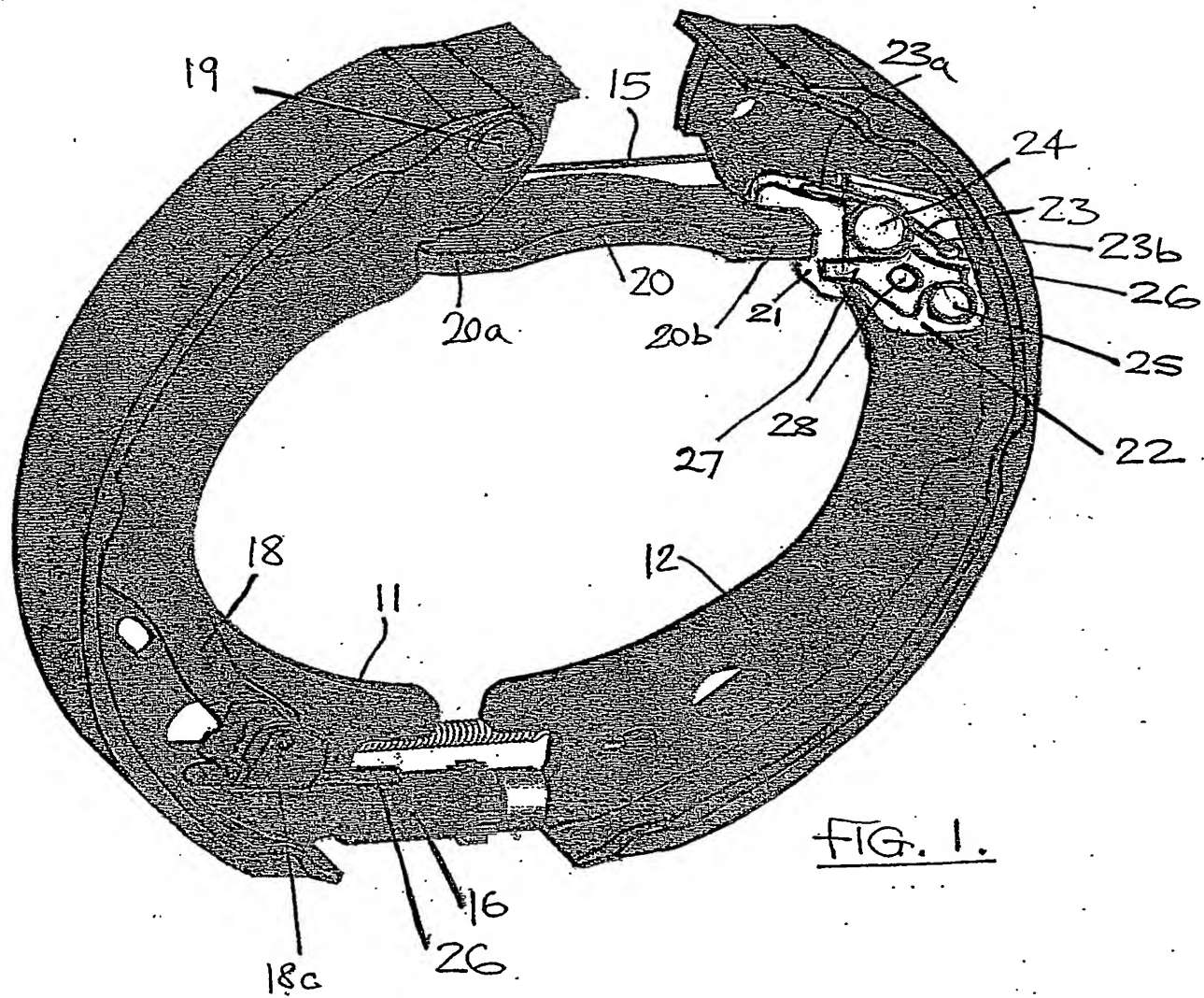


FIG. 1.

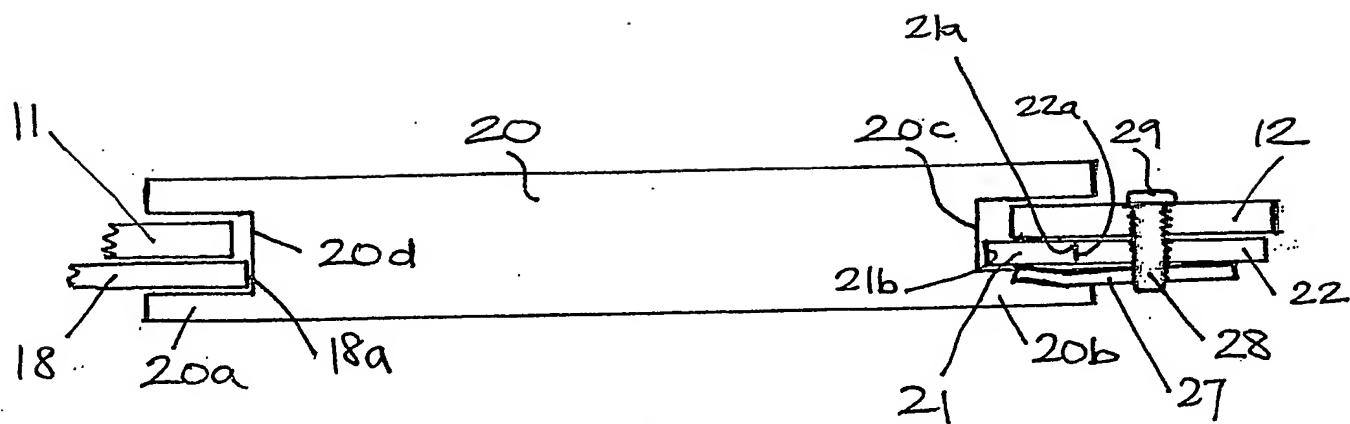


FIG. 4.

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